Claims

1. An isolated mammalian sodium channel protein comprising
   (i) The amino acid sequence shown in SEQ I.D No 2 or
   (ii) A variant thereof which has at least 70% identity to the amino acid sequence of SEQ I.D. No 2.

2. A protein according to claim 1 wherein the variant has at least 90% identity to the amino acid sequence of SEQ I.D. No 2.

3. An isolated sodium channel protein according to claim 1 ~~or 2~~ which is a human protein.

4. An isolated sodium channel protein according to claim 1 which is derivable from the dorsal root ganglion of a mammal and which has an IC50 for TTX of about 1 μM.

5. An isolated nucleotide sequence encoding a sodium channel protein or variant thereof according to ~~any one of claims 1 to 4~~ claim 1.

6. An isolated nucleotide sequence according to claim 5 which is a DNA sequence.

7. An isolated nucleotide sequence according to claim 5 which comprises:
   (a) the nucleic acid sequence of SEQ ID NO 1 and/or a sequence complementary thereto; or
   (b) a sequence which hybridises under stringent conditions to a sequence as defined in (a); or
   (c) a sequence that is degenerate as a result of the genetic code to a sequence as defined in (a) or (b); or
   (d) a sequence having at least 70% identity to a sequence as defined in (a), (b) or (c).

8. A recombinant polynucleotide which comprises:

(a) one or more of the nucleotide sequences of SEQ ID NO 3 to 17 and/or a sequence complementary thereto; or
(b) a sequence which hybridises under stringent conditions to a sequence as defined in (a); or
(c) a sequence that is degenerate as a result of the genetic code to a sequence as defined in (a) or (b); or
(d) a sequence having at least 70% identity to a sequence as defined in (a), (b) or (c).

9. A recombinant polynucleotide according to claim 8 which comprises all of the sequences as defined in SEQ ID 3 to 17 wherein ascending numerical order represents the order in which the SEQ ID is read in the 5' to 3' direction

10. An isolated amino acid sequence encoded for by a nucleotide according to claim 8 ~~or 9~~.

11. An expression vector comprising a polynucleotide according to Claim 5 ~~any one of claims 5 to 9~~.

12. A host cell comprising an expression vector according to claim 11.

13. An antibody or fragment thereof which recognises and binds to a polypeptide according Claim 1 ~~any one of claims 1 to 4~~.

14. An isolated polypeptide according to Claim 1 ~~any one of claims 1 to 4~~ for use in a method of screening for agents with analgesic or anti-hypersensivity activity.

15. A method for the identification of a modulator of a sodium channel protein according to Claim 1 ~~any one of claims 1 to 4~~, comprising contacting said protein with a test compound and detecting changes in the activity of the sodium channel protein due to the test compound.

16. A method of determining whether a test compound is a modulator of sodium flux which method comprises expressing a protein according to Claim 1 ~~any one of~~

~~claims 1 - 4~~ in a host cell; contacting said protein with a test compound; and measuring sodium flux.

17. A modulator identifiable by a method according to claim 15 ~~or 16~~, for use in therapy.

18. Use of a modulator indentifiable by a method as claimed in claim 15 ~~or 16~~ for the manufacture of an analgesic or anti-hypersensitivity medicament.

19. A method of treating a disorder which is responsive to modulation of a protein according to claim 1 ~~any one of claims 1 to 4~~ which method comprises administering to a patient an effective amount of a modulator, identifiable by a method according to claim 15 ~~or 16~~.

Team leader
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CLM

1 GGAGCCATAC GGTGCCCTGA TCCTCTGTAC CAGGAAGACA GGGTGAAGAT

51 GGAGGAGAGG TACTACCCGG TGATCTTCCC GGACGAGCGG AATTTCCGCC

101 CCTTCACTTC CGACTCTCTG GCTGCCATAA AGAAGCGGAT TGCTATCCAA

151 AAGGAGAGGA AGAAGTCCAA AGACAAGGCG GCAGCTGAGC CCCAGCCTCG

201 GCCTCAGCTT GACCTAAAGG CCTCCAGGAA GTTACCTAAG CTTTATGGTG

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5551 CGGAAGGCCT GGAGGACAGT CCAACTTACA TAAAGATGAG AAACAAGAAG

5601 GAAAGATCCC AGGAAAACTT CAGATTGTGT TCTCAGTACA TTCCCCAATG

5651 TGTCTGTTCG GTGTTTTGAG TATGTGACCT GCCACATGTA GCTCTTTTTT

5701 GCATGTACGT CAAAACCCTG CAGTAAGTTA ATAGCTTGCT ACGGGTGTTC

5751 CTACCAGCAT CACAGAATTG GGTGTATGAC TCAAACCTAA AAGCATGACT

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5 Y Y P V I F P D E R N F R P F T S D S L 24

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25 A A I K K R I A I Q K E R K K S K D K A 44

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45 A A E P Q P R P Q L D L K A S R K L P K 64

193 CTTTATGGTGACATTCCCCCTGAGCTTGTTACGAAACCTCTGGAGGACCTGGACCCCTAC 252
65 L Y G D I P P E L V T K P L E D L D P Y 84

253 TACAAAGACCATAAGACATTCATGGTGTTGAACAAGAAAAGAACAATTTATCGCTTCAGC 312
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145 F M A N S M E R S F D N D I P E Y V F I 164

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165 G I Y I L E A V I K I L A R G F I V D E 184

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733 CGCTCGGTGAAGAAGCTGGTAGACGTGATGGTCCTCACTCTCTTCTGCCTCAGCATCTTT 792
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793 GCCCTGGTCGGTCAGCAGCTGTTCATGGGAATTCTGAACCAGAAGTGTATTAAGCACAAC 852
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853 TGTGGCCCCAACCCTGCATCCAACAAGGATTGCTTTGAAAAGGAAAAAGATAGCGAAGAC 912
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913 TTCATAATGTGTGGTACCTGGCTCGGCAGCAGACCCTGTCCCAATGGTTCTACGTGCGAT 972
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973 AAAACCACATTGAACCCAGACAATAATTATACAAAGTTTGACAACTTTGGCTGGTCCTTT 1032
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4033 AGCCAGGTCTTTGACGTCATCATTCTGGGTCTTATTGTCTTAAATATGATTATCATGATG 4092
1345 S Q V F D V I I L G L I V L N M I I M M 1364

4093 GCTGAATCTGCCGACCAGCCCAAAGATGTGAAGAAAACCTTTGATATCCTCAACATAGCC 4152
1365 A E S A D Q P K D V K K T F D I L N I A 1384

4153 TTCGTGGTCATCTTTACCATAGAGTGTCTCATCAAAGTCTTTGCTTTGAGGCAACACTAC 4212
1385 F V V I F T I E C L I K V F A L R Q H Y 1404

4213 TTCACCAATGGCTGGAACTTATTTGATTGTGTGGTCGTGGTTCTTTCTATCATTAGTACC 4272
1405 F T N G W N L F D C V V V V L S I I S T 1424

4273 CTGGTTTCCCGCTTGGAGGACAGTGACATTTCTTTCCCGCCCACGCTCTTCAGAGTCGTC 4332
1425 L V S R L E D S D I S F P P T L F R V V 1444

4333 CGCTTGGCTCGGATTGGTCGAATCCTCAGGCTGGTCCGGGCTGCCCGGGGAATCAGGACC 4392
1445 R L A R I G R I L R L V R A A R G I R T 1464

4393 CTCCTCTTTGCTTTGATGATGTCTCTCCCCTCTCTCTTCAACATCGGTCTGCTGCTCTTC 4452
1465 L L F A L M M S L P S L F N I G L L L F 1484

4453 CTGGTGATGTTCATTTACGCCATCTTTGGGATGAGCTGGTTTTCCAAAGTGAAGAAGGGC 4512
1485 L V M F I Y A I F G M S W F S K V K K G 1504

4513 TCCGGGATCGACGACATCTTCAACTTCGAGACCTTTACGGGCAGCATGCTGTGCCTCTTC 4572

1505 S G I D D I F N F E T F T G S M L C L F 1524

4573 CAGATAACCACTTCGGCTGGCTGGGATACCCTCCTCAACCCCATGCTGGAGGCAAAAGAA 4632
1525 Q I T T S A G W D T L L N P M L E A K E 1544

4633 CACTGCAACTCCTCCTCCCAAGACAGCTGTCAGCAGCCGCAGATAGCCGTCGTCTACTTC 4692
1545 H C N S S S Q D S C Q Q P Q I A V V Y F 1564

4693 GTCAGTTACATCATCATCTCCTTCCTCATCGTGGTCAACATGTACATCGCTGTGATCCTC 4752
1565 V S Y I I I S F L I V V N M Y I A V I L 1584

4753 GAGAACTTCAACACAGCCACGGAGGAGAGCGAGGACCCTCTGGGAGAGGACGACTTTGAA 4812
1585 E N F N T A T E E S E D P L G E D D F E 1604

4813 ATCTTCTATGAGGTCTGGGAGAAGTTTGACCCCGAGGCGTCGCAGTTCATCCAGTATTCG 4872
1605 I F Y E V W E K F D P E A S Q F I Q Y S 1624

4873 GCCCTCTCTGACTTTGCGGACGCCCTGCCGGAGCCGTTGCGTGTGGCCAAGCCGAATAAG 4932
1625 A L S D F A D A L P E P L R V A K P N K 1644

4933 TTTCAGTTTCTAGTGATGGACTTGCCCATGGTGATGGGCGACCGCCTCCATTGCATGGAT 4992
1645 F Q F L V M D L P M V M G D R L H C M D 1664

4993 GTTCTCTTTGCTTTCACTACCAGGGTCCTCGGGGACTCCAGCGGCTTGGATACCATGAAA 5052
1665 V L F A F T T R V L G D S S G L D T M K 1684

5053 ACCATGATGGAGGAGAAGTTTATGGAGGCCAACCCTTTTAAGAAGCTCTACGAGCCCATA 5112
1685 T M M E E K F M E A N P F K K L Y E P I 1704

5113 GTCACCACCACCAAGAGGAAGGAGGAGGAGCAAGGCGCCGCCGTCATCCAGAGGGCCTAC 5172
1705 V T T T K R K E E E Q G A A V I Q R A Y 1724

5173 CGGAAACACATGGAGAAGATGGTCAAACTGAGGCTGAAGGACAGGTCAAGTTCATCGCAC 5232
1725 R K H M E K M V K L R L K D R S S S S H 1744

5233 CAGGTGTTTTGCAATGGAGACTTGTCCAGCTTGGATGTGGCCAAGGTCAAGGTTCACAAT 5292
1745 Q V F C N G D L S S L D V A K V K V H N 1764

5293 GACTGAACCCTCATCTCCACCCCTACCTCACTGCCTCACAGCTTAGCCTCCAGCCTCTGG 5352
1765 D • 1766

5353 CGAGCAGGCGGCAGACTCACTGAACACAGGCCGTTCGATCTGTGTTTTTGGCTGAACGAG 5412

5413 GTGACAGGTTGGCGTCCATTTTTAAATGACTCTTGGAAAGATTTCATGTAGAGAGATGTT 5472

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5653 GCATGTACGTCAAAACCCTGCAGTAAGTTAATAGCTTGCTACGGGTGTTCCTACCAGCAT 5712

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Human SNS_{2A} sequences

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SEQ.I.D.NO.15

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SEQ.I.D.NO:17

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